

fitted from surgical treatment required rather complicated recordings of chest wall and abdominal movements, nasal and oral air flow, extraocular muscle movements, intraesophageal pressures and intra-arterial oxygen saturation, as well as an electroencephalogram, electrocardiogram and electromyogram.

A simple technique is now available to estimate arterial oxygen and carbon dioxide tension with continuous skin surface electrode recordings. The skin surface oxygen tension (P_{SO_2}) and carbon dioxide tension (P_{SCO_2}) closely parallel arterial oxygen and carbon dioxide tensions, with response times between 45 seconds and two minutes. Concomitant respiratory efforts can be readily detected by a trained observer. Nasal and oral air flow are easily determined by auscultation, and sleep state evaluated as active (rapid eye movements, intermittent low-amplitude movements of the extremities and irregular respiration) or quiet. The portable electrode recordings, when combined with careful clinical evaluation, eliminate the previous cumbersome sleep study protocols, and permit a rapid assessment of those patients who may benefit from surgical intervention.

Decreases in P_{SO_2} to 50 mm of mercury or less combined with increases in P_{SCO_2} of 45 mm of mercury or more during sleep correlate well with OSA. Following surgical correction of the mechanical obstruction, P_{SO_2} and P_{SCO_2} determinations should return to normal during sleep, with resolution of OSA and its more subtle clinical manifestations.

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REFERENCES

- Rowe LD, Hansen TN, Nielsen D, et al: Continuous measurements of skin surface oxygen and carbon dioxide tensions in obstructive sleep apnea. *Laryngoscope* 90:1980 (In press)
- Guilleminault C, Eldridge FL, Simmons FB, et al: Sleep apnea in eight children. *Pediatrics* 58:23-30, Jul 1976
- Simmons FB, Hill MW: Hypersomnia caused by upper airway obstructions: A new syndrome in otolaryngology. *Ann Otol Rhinol Laryngol* 83:670-673, Sep-Oct 1974

Nasopharyngeal Carcinoma

A UNIQUE, racially balanced North American series of 209 patients with nasopharyngeal carcinoma (NPC) who were treated by primary radiation therapy was studied. Of these patients, 49 percent were Chinese and 51 percent were non-Chinese (predominantly white). Whereas Chinese born in China had a 117.9 times greater incidence of the disease (27.12 per 100,000 population per year), Chinese born in North America showed only a 7.3 times greater inci-

dence (1.69 per 100,000 population per year) than whites (0.23 per 100,000 population per year). The five-year absolute survival with no evidence of disease (NED) was 25.6 percent for Chinese and 32 percent for non-Chinese patients. Neither this nor other racial differences were statistically significant.

The ultimate survival and prognosis of patients appeared to depend on four main factors.

(1) Histological classification of the tumor had a statistically significant effect on survival. Patients with nonkeratinizing squamous cell carcinoma had a better prognosis (31.5 percent, five-year NED) than those with keratinizing squamous cell carcinoma (16.3 percent, five-year NED). Patients with lymphoepithelioma had the best survival (52.4 percent, five-year NED). Hoppe and colleagues described a 50 percent incidence of lymphoepithelioma in their series, which partially accounts for their excellent overall survival rate.

(2) The stage of the tumor had a significant effect. The overall five-year NED survival for the series was 29 percent. When localized NCP, with or without nodes, was analyzed, the survival rate was increased to 41 percent, five-year NED.

(3) The dose of radiation given was important. Patients treated with 6,000 rads or more had a 35.7 percent, five-year NED survival, irrespective of the tumor's stage. Hoppe and colleagues used even higher doses of therapy to achieve their excellent results.

(4) A newly described factor affecting survival of patients with NPC is biopsy of nodes before irradiation. Two groups of patients with nasopharyngeal carcinoma that metastasized to the neck, and differing only in the variable of a biopsy being done before treatment, were studied. The trend toward poorer survival was consistent when biopsies of nodes in the neck were done before radiation therapy. This was most apparent in patients with mobile nodes, who had a five-year NED survival of 46.9 percent when nodes were not biopsied and 25 percent when they were. This difference approached statistical significance ($P=0.063$), and is evidence that excision of the node before irradiation should be avoided in the management of NPC. McGuirt and McCabe reported similar findings in assessing complications seen after neck biopsy before radical neck operations.

Any patient with a suspicious node in the neck must be completely searched for a primary tumor

before excising the node. Aspiration needle biopsy should be considered as a safer alternative diagnostic procedure.

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REFERENCES

- Hoppe RT, Goffinet DR, Bagshaw MA: Carcinoma of the nasopharynx. *Cancer* 37:2605-2612, Jun 1976
- McGuirt WF, McCabe BF: Significance of node biopsy before definitive treatment of cervical metastatic carcinoma. *Laryngoscope* 88:594-597, Apr 1978
- Russ JE, Scanlon EF, Christ MA: Aspiration cytology of head and neck masses. *Am J Surg* 136:342-347, Sep 1978

Myocutaneous Flaps for Head and Neck Reconstruction

THE RECENT DEVELOPMENT of myocutaneous flaps has improved the success of one-stage (primary) reconstruction of extirpative defects of the head and neck. These regionally based flaps can be rotated from the neck, chest or back on branches of the thoracoacromial, external carotid arteries or thyrocervical trunk to resurface cutaneous defects of up to 12 by 20 cm. Bone from the ribs or scapula can also be incorporated as a compound osteomyocutaneous flap to reconstruct bony defects of the mandible, maxilla or skull.

The survival of any flap depends on maintaining satisfactory circulation. The cutaneous portion of the myocutaneous flap receives its blood flow by way of an anatomically recognized arteriovenous circulation that follows the long axis of the flap, on the deep surface of the muscle, ultimately providing branches to the distal dermal-subdermal plexus via perforating vessels up through the muscle. The viable length of this flap is therefore not related to its width, but rather to its intact perfusion of blood via specific axial vessels included in the flap. This is contrasted to flaps perfused in random fashion in which nutrients are derived solely from intercommunications of vessels in the dermal-subdermal plexus with those from the flap's pedicle.

Examples of regional myocutaneous flaps being used include the pectoralis major (based on the pectoral branches of the thoracoacromial artery), the trapezius (based on branches of the thyrocervical trunk, especially the transverse cervical artery), the sternocleidomastoideus (based superiorly on branches of the occipital artery, in the midportion on branches of the superior thyroid artery or inferiorly on branches of the inferior thyroid artery) and the latissimus dorsi (based on branches of the thoracodorsal artery).

Where bone is required, portions of the clavicle, ribs or scapula can be incorporated. Of these, the pectoralis flap appears to be the most reliable and useful.

Flaps have been used to reconstruct the floor of the mouth, pharynx, esophagus and soft tissues of the head and neck, as well as defects in the mandible, maxilla and other portions of the skull. The donor site can often be closed primarily, but skin grafting may be required where larger "paddles" of skin are transferred. Smaller flaps can be used in women without sacrifice or significant distortion of the overlying breast tissue.

The availability, technical ease of the operation (as opposed to microvascular flap transfer which may take 9 to 14 hours to accomplish) and reliability of these flaps make them very attractive for reconstruction of a variety of sites in the head and neck region. They do not require initial delay or subsequent flap division. They tolerate radiation well and are outside the field of radiation if preoperative radiation is required, or if the procedure is required for surgical salvage of radiation failure.

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REFERENCES

- Ariyan S, Cuono CB: Myocutaneous flaps for head and neck reconstruction. *Head Neck Surg* 2:321-345, Mar-Apr 1980
- Baek SM, Biller HF, Krespi YP, et al: The pectoralis major myocutaneous island flap for reconstruction of the head and neck. *Head Neck Surg* 1:293-300, Mar-Apr 1979
- Grabb WC, Myers MB: *Skin Flaps*. Boston, Little, Brown & Co, 1975

Cricothyroidotomy

AMONG THE BETTER established canons of current medical practice is avoidance of prolonged tracheal intubation via a cricothyroidotomy. This procedure has been reserved for situations of extreme airway obstruction when endotracheal intubation is impossible. It is advised that the cricothyroidotomy be converted to formal tracheotomy when the clinical situation becomes stabilized (within 24 hours).

Support for this position has its foundation in an article by Chevalier Jackson published in 1921, which condemned "high tracheotomy" in no uncertain terms. In that era, such emergency procedures were done to relieve obstruction from acute inflammatory disease of the larynx such as diphtheria and croup. Jackson's conclusion was that acute laryngeal inflammation was aggravated by the proximity of a cricothyroidotomy and resulted in chronic laryngeal stenosis. This conclu-